FIG.1

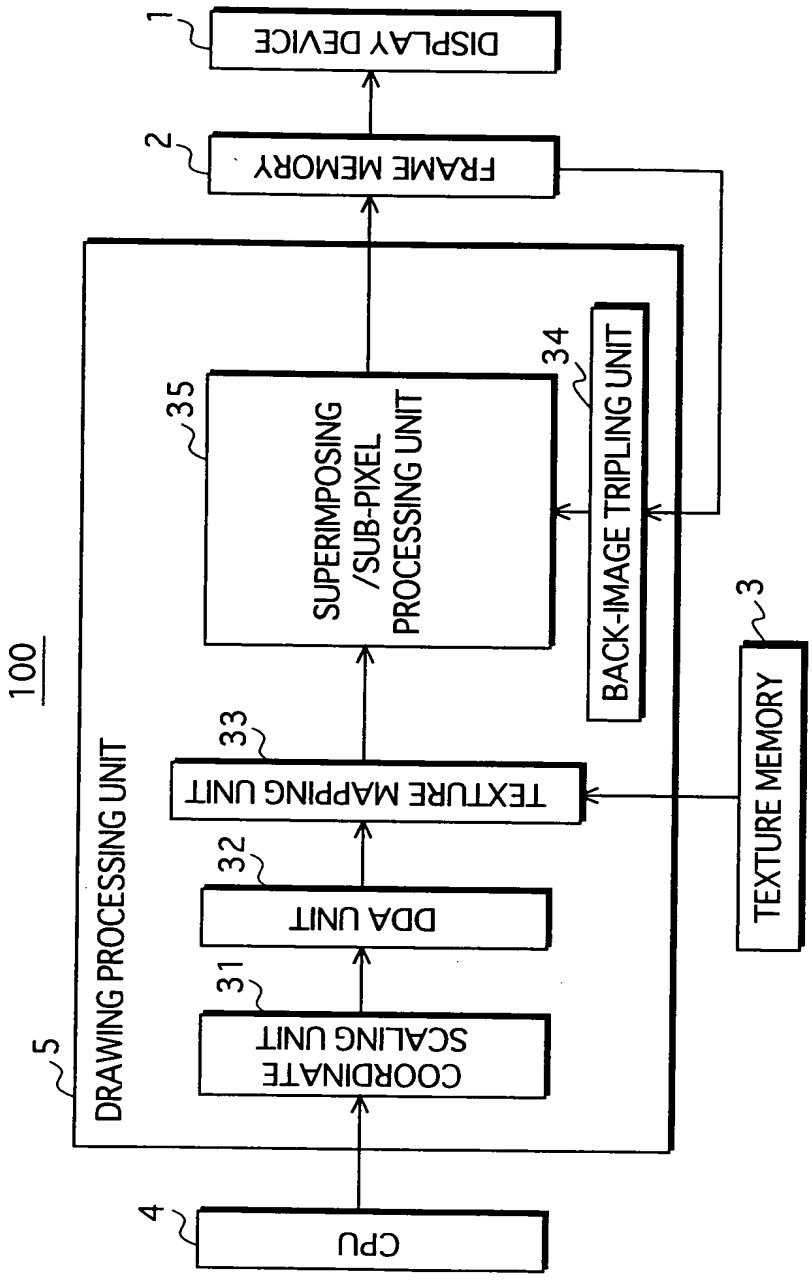

100
DISPLAY DEVICE
1
FRAME MEMORY
2
DRAWING PROCESSING UNIT
5
SUPERIMPOSING /SUB-PIXEL PROCESSING UNIT
35
BACK-IMAGE TRIPLING UNIT
34
TEXTURE MAPPING UNIT
33
DDA UNIT
32
COORDINATE SCALING UNIT
31
CPU
4
TEXTURE MEMORY
3

FIG.2

21 22a 22b 22c

PIXEL COORDINATES		COLOR VALUE			α VALUE
u	v	R	G	B	
0	0	0.2	0.2	0.2	0
1	0	0.2	0.2	0.2	0.7
2	0	0.3	0.2	0.2	0.7
3	0	0.3	0.2	0.2	0.7
4	0	0.3	0.2	0.2	0.7
5	0	0.4	0.2	0.2	0.8
6	0	0.4	0.2	0.3	0.8
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
.	.	.	.	.	.
			.	.	.

FIG.3

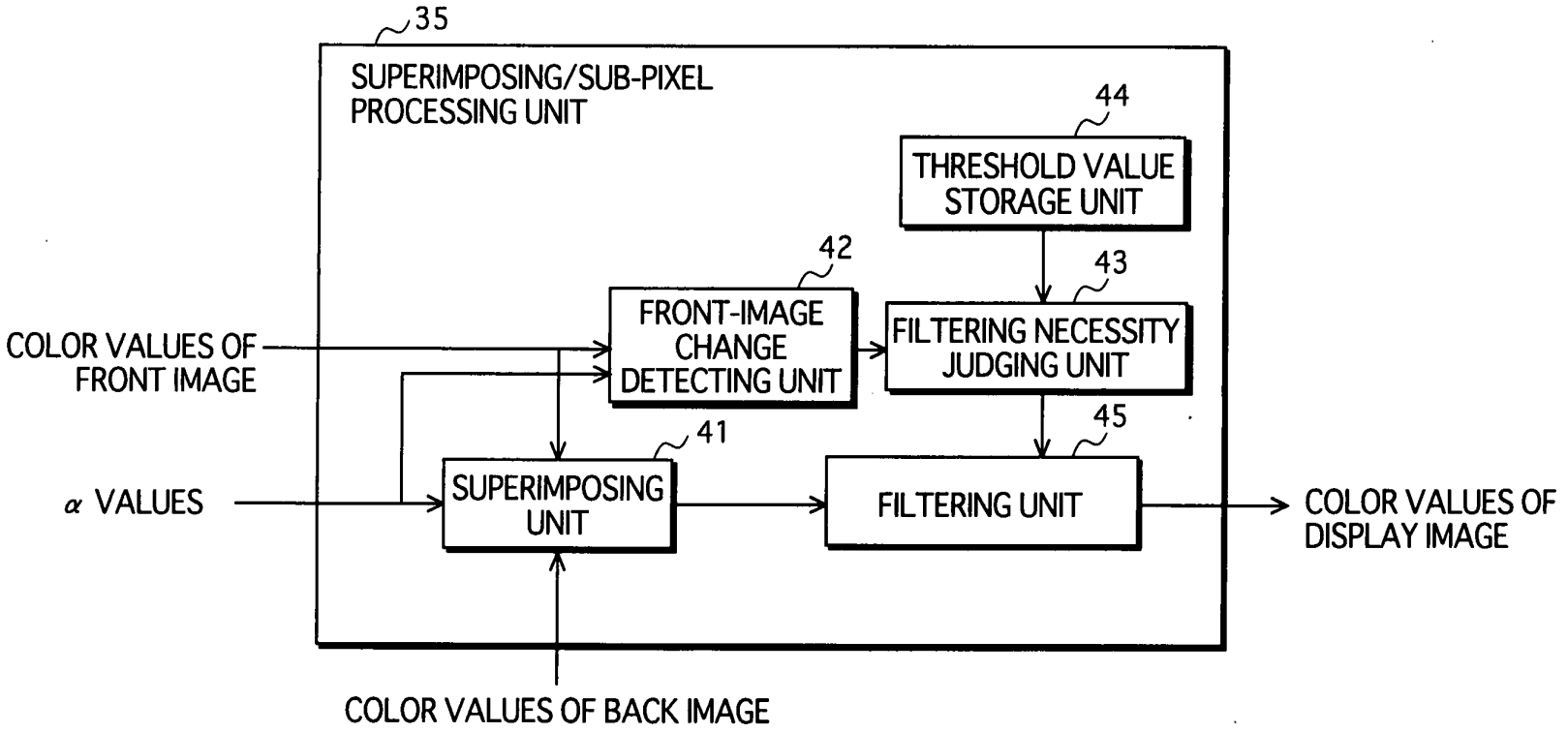

35
SUPERIMPOSING/SUB-PIXEL PROCESSING UNIT
44
THRESHOLD VALUE STORAGE UNIT
42
43
FRONT-IMAGE CHANGE DETECTING UNIT
FILTERING NECESSITY JUDGING UNIT
COLOR VALUES OF FRONT IMAGE
41
45
α VALUES
SUPERIMPOSING UNIT
FILTERING UNIT
COLOR VALUES OF DISPLAY IMAGE
COLOR VALUES OF BACK IMAGE

FIG.4

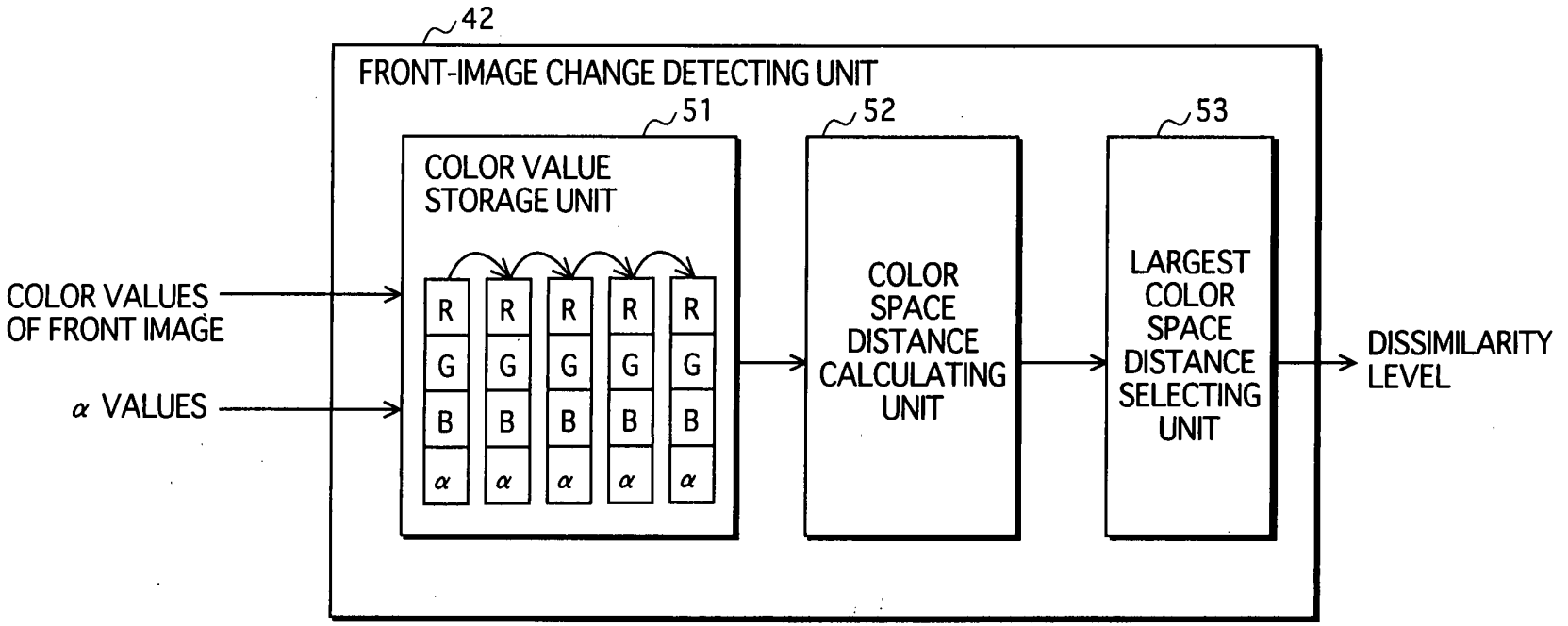

42
FRONT-IMAGE CHANGE DETECTING UNIT
51
COLOR VALUE STORAGE UNIT
52
COLOR SPACE DISTANCE CALCULATING UNIT
53
LARGEST COLOR SPACE DISTANCE SELECTING UNIT
COLOR VALUES OF FRONT IMAGE
α VALUES
DISSIMILARITY LEVEL
R
G
B
α

FIG.5

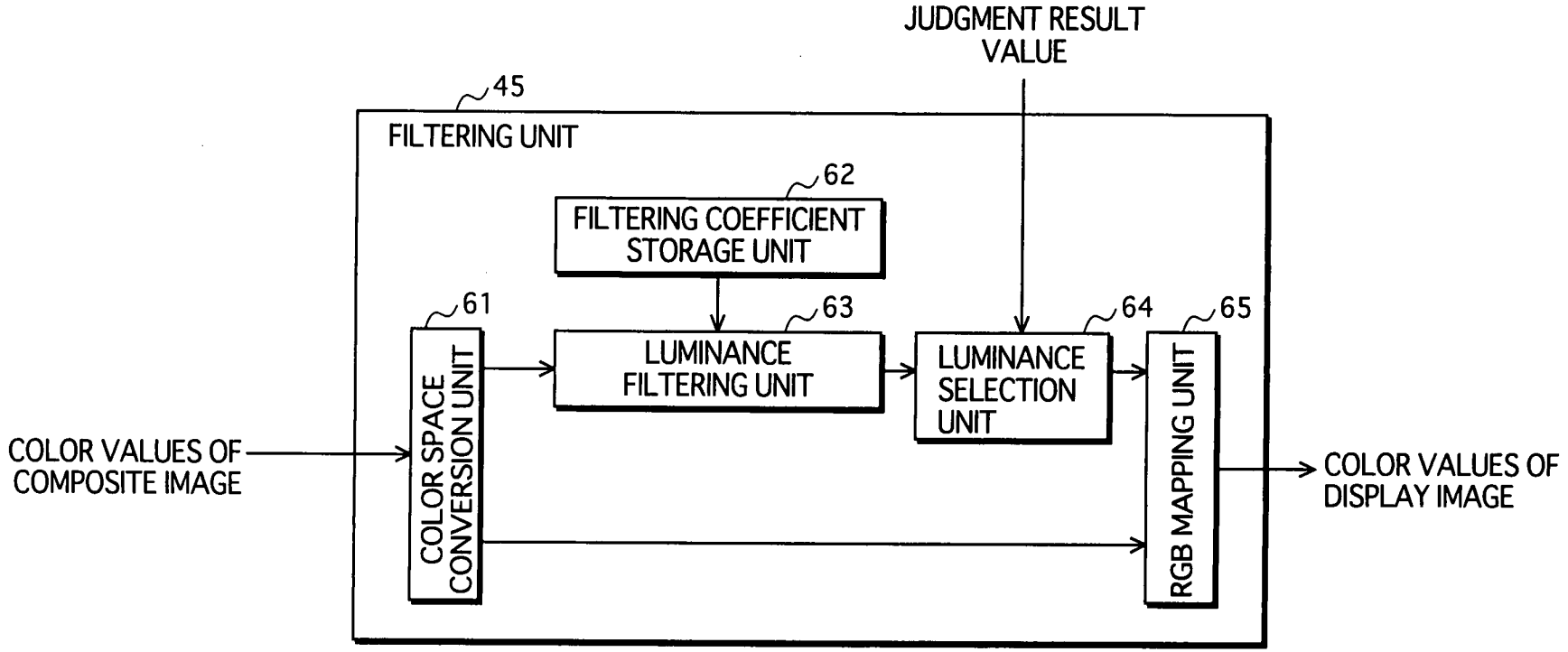

JUDGMENT RESULT VALUE
45
FILTERING UNIT
62
FILTERING COEFFICIENT STORAGE UNIT
61
63
64
65
COLOR SPACE CONVERSION UNIT
LUMINANCE FILTERING UNIT
LUMINANCE SELECTION UNIT
RGB MAPPING UNIT
COLOR VALUES OF COMPOSITE IMAGE
COLOR VALUES OF DISPLAY IMAGE

FIG.6

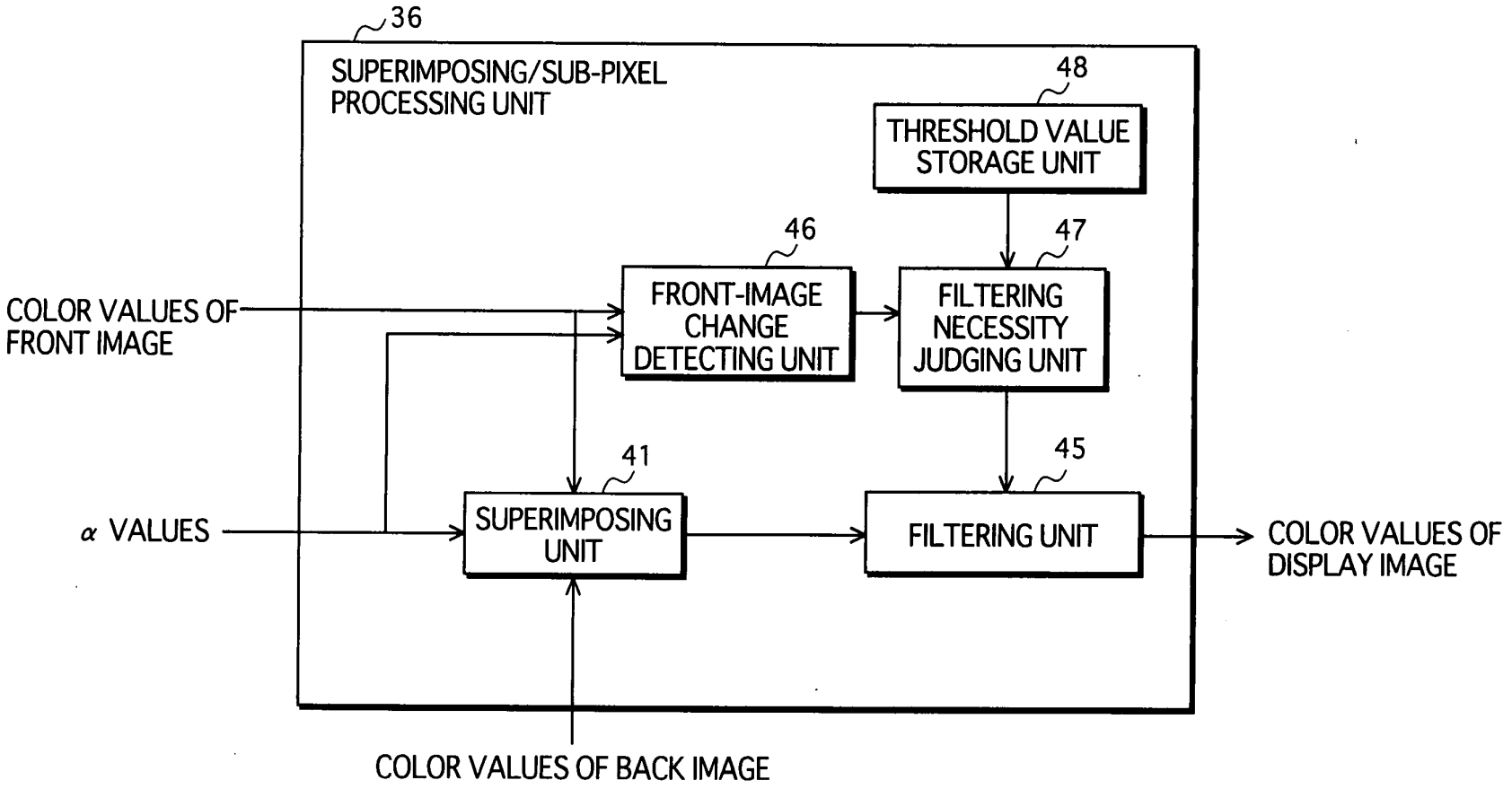

36
SUPERIMPOSING/SUB-PIXEL PROCESSING UNIT
48
THRESHOLD VALUE STORAGE UNIT
46
47
FRONT-IMAGE CHANGE DETECTING UNIT
FILTERING NECESSITY JUDGING UNIT
COLOR VALUES OF FRONT IMAGE
41
45
α VALUES
SUPERIMPOSING UNIT
FILTERING UNIT
COLOR VALUES OF DISPLAY IMAGE
COLOR VALUES OF BACK IMAGE

FIG.7

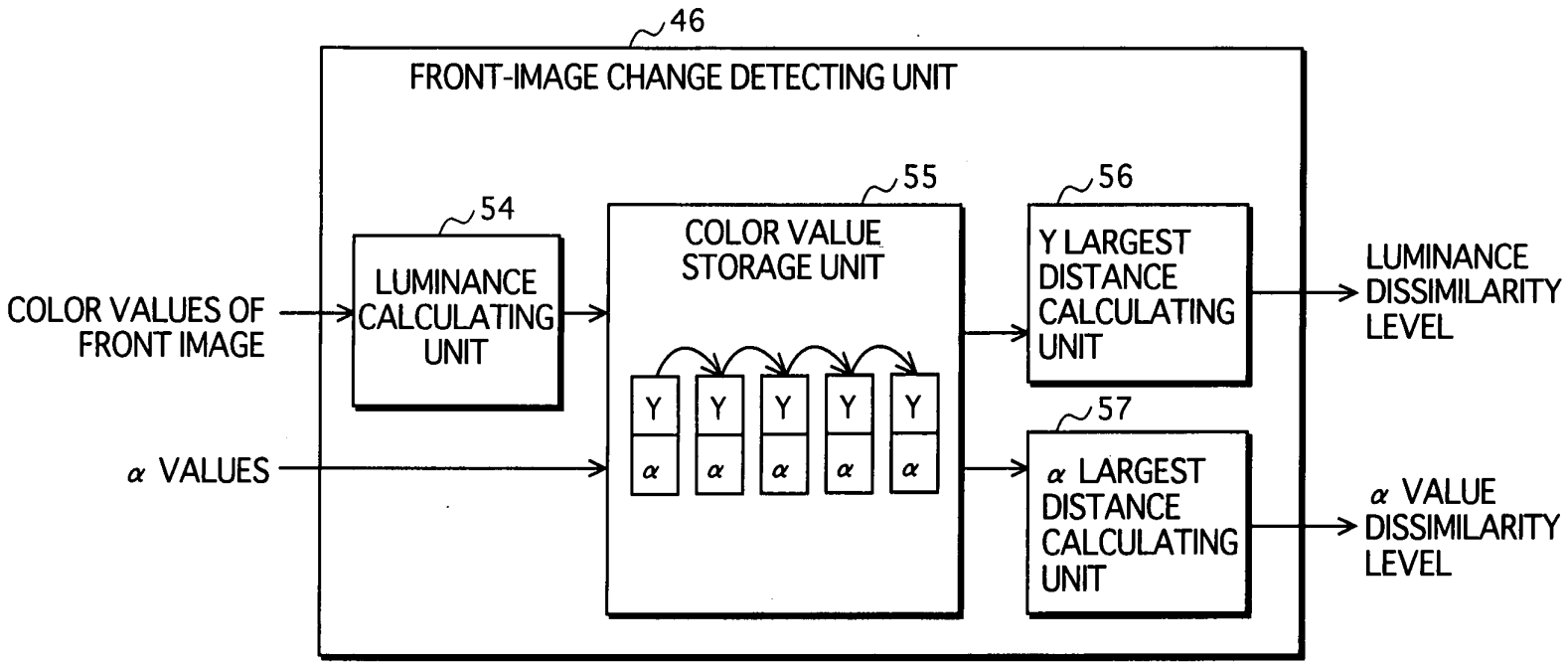

46
FRONT-IMAGE CHANGE DETECTING UNIT
54
LUMINANCE CALCULATING UNIT
55
COLOR VALUE STORAGE UNIT
56
Y LARGEST DISTANCE CALCULATING UNIT
57
α LARGEST DISTANCE CALCULATING UNIT
COLOR VALUES OF FRONT IMAGE
α VALUES
LUMINANCE DISSIMILARITY LEVEL
α VALUE DISSIMILARITY LEVEL
Y
α

FIG.8

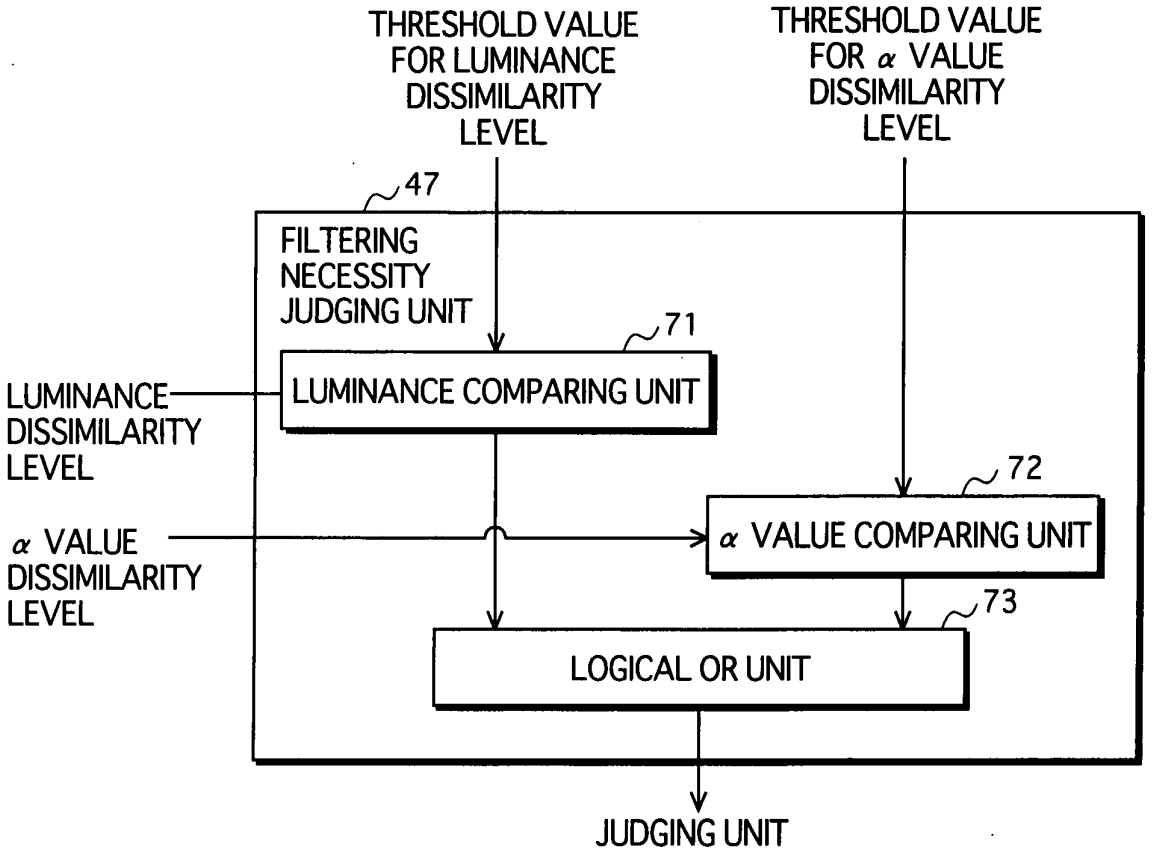

THRESHOLD VALUE FOR LUMINANCE DISSIMILARITY LEVEL
THRESHOLD VALUE FOR α VALUE DISSIMILARITY LEVEL
47
FILTERING NECESSITY JUDGING UNIT
71
LUMINANCE COMPARING UNIT
LUMINANCE DISSIMILARITY LEVEL
72
α VALUE COMPARING UNIT
α VALUE DISSIMILARITY LEVEL
73
LOGICAL OR UNIT
JUDGING UNIT

FIG.9

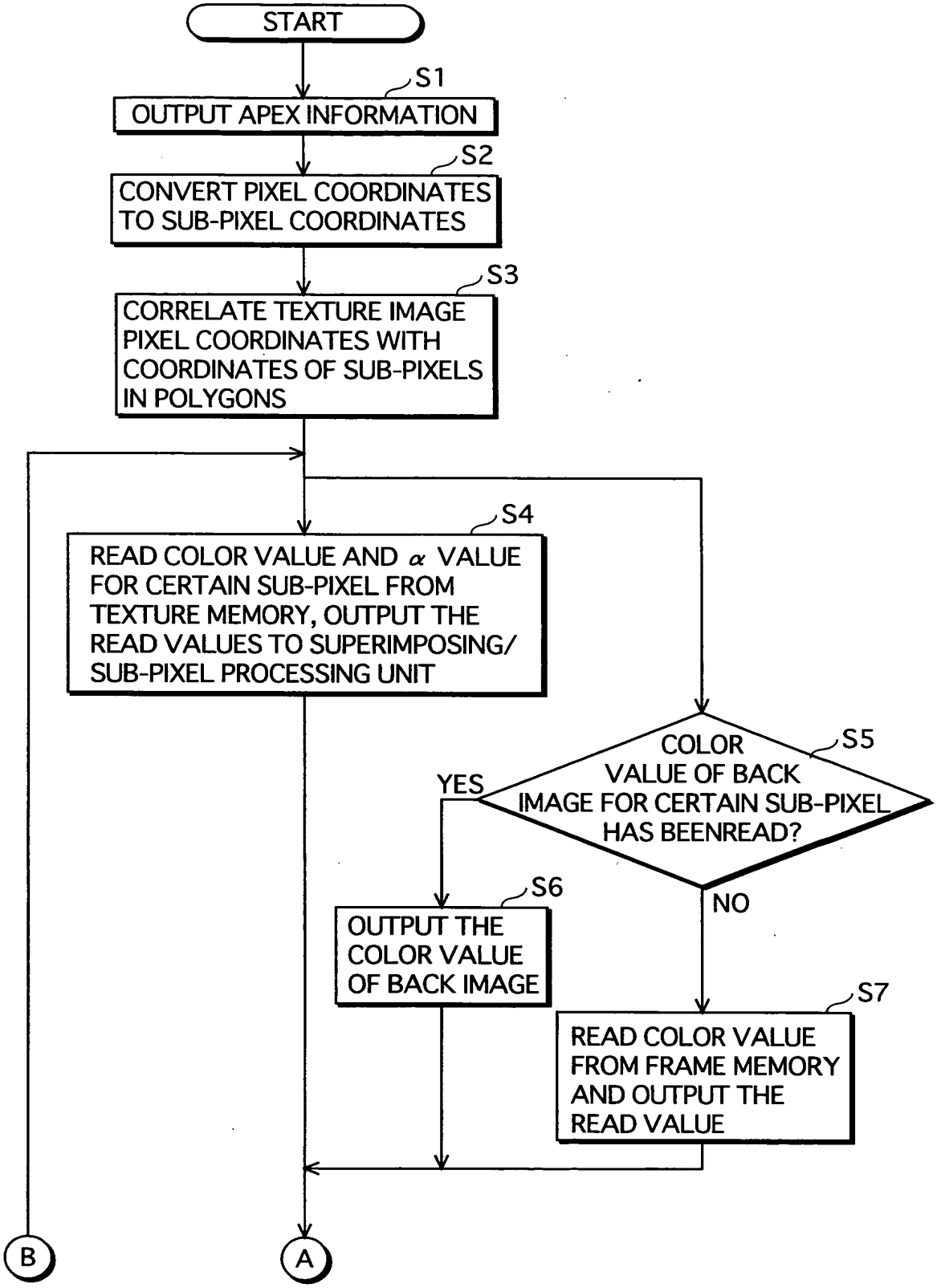

START
S1
OUTPUT APEX INFORMATION
S2
CONVERT PIXEL COORDINATES TO SUB-PIXEL COORDINATES
S3
CORRELATE TEXTURE IMAGE PIXEL COORDINATES WITH COORDINATES OF SUB-PIXELS IN POLYGONS
S4
READ COLOR VALUE AND α VALUE FOR CERTAIN SUB-PIXEL FROM TEXTURE MEMORY, OUTPUT THE READ VALUES TO SUPERIMPOSING/ SUB-PIXEL PROCESSING UNIT
S5
COLOR VALUE OF BACK IMAGE FOR CERTAIN SUB-PIXEL HAS BEENREAD?
YES
NO
S6
OUTPUT THE COLOR VALUE OF BACK IMAGE
S7
READ COLOR VALUE FROM FRAME MEMORY AND OUTPUT THE READ VALUE
B
A

FIG.10

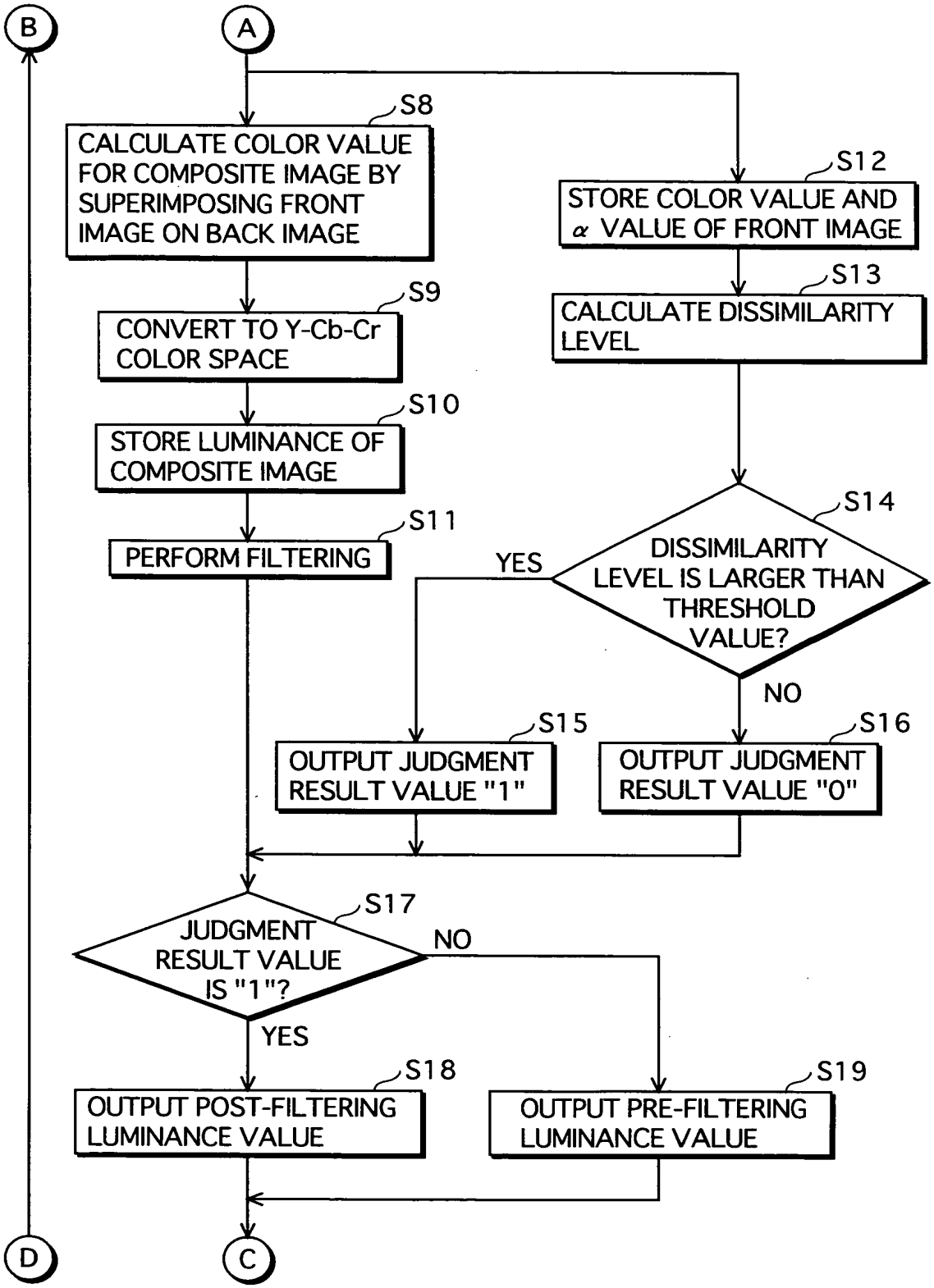

B
A
S8
CALCULATE COLOR VALUE FOR COMPOSITE IMAGE BY SUPERIMPOSING FRONT IMAGE ON BACK IMAGE
S9
CONVERT TO Y-Cb-Cr COLOR SPACE
S10
STORE LUMINANCE OF COMPOSITE IMAGE
S11
PERFORM FILTERING
S12
STORE COLOR VALUE AND α VALUE OF FRONT IMAGE
S13
CALCULATE DISSIMILARITY LEVEL
S14
DISSIMILARITY LEVEL IS LARGER THAN THRESHOLD VALUE?
YES
NO
S15
OUTPUT JUDGMENT RESULT VALUE "1"
S16
OUTPUT JUDGMENT RESULT VALUE "0"
S17
JUDGMENT RESULT VALUE IS "1"?
NO
YES
S18
OUTPUT POST-FILTERING LUMINANCE VALUE
S19
OUTPUT PRE-FILTERING LUMINANCE VALUE
D
C

FIG.11

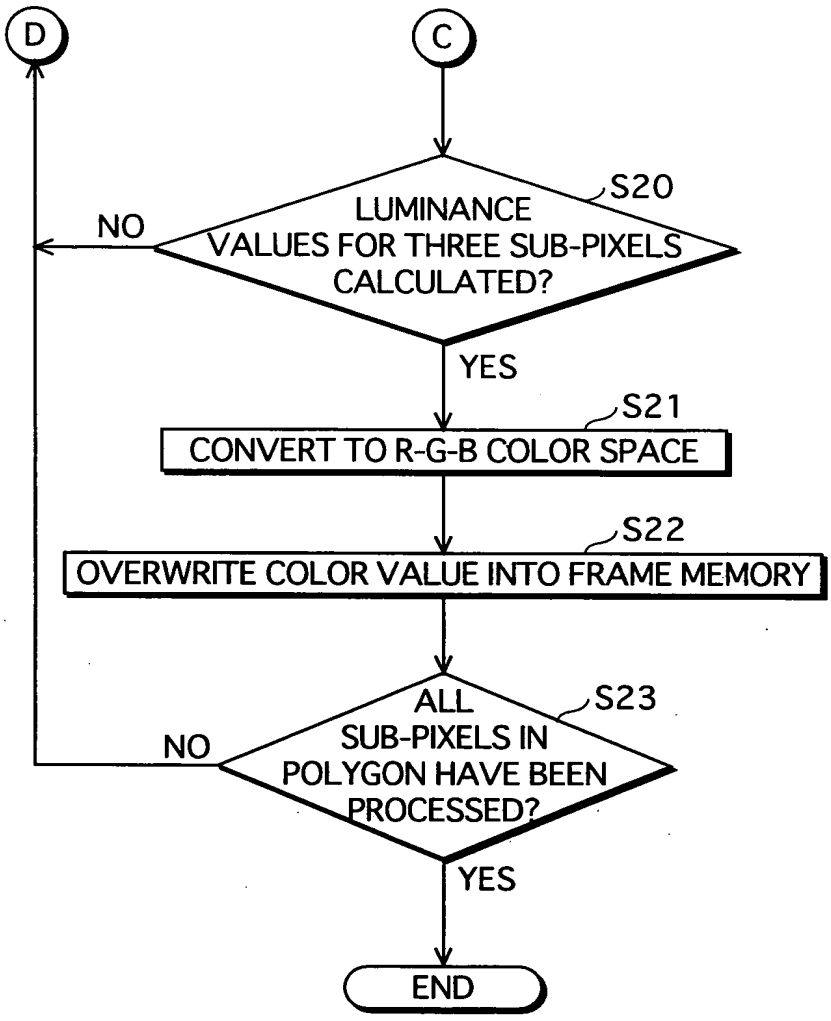

D
C
S20
LUMINANCE VALUES FOR THREE SUB-PIXELS CALCULATED?
NO
YES
S21
CONVERT TO R-G-B COLOR SPACE
S22
OVERWRITE COLOR VALUE INTO FRAME MEMORY
S23
ALL SUB-PIXELS IN POLYGON HAVE BEEN PROCESSED?
NO
YES
END

FIG.12

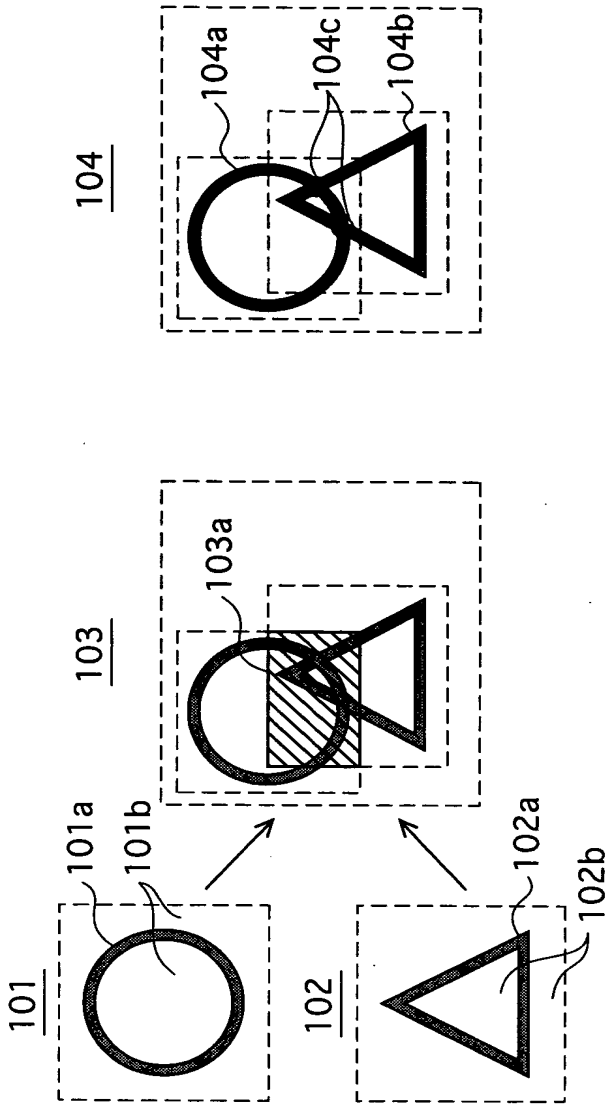


FIG.13

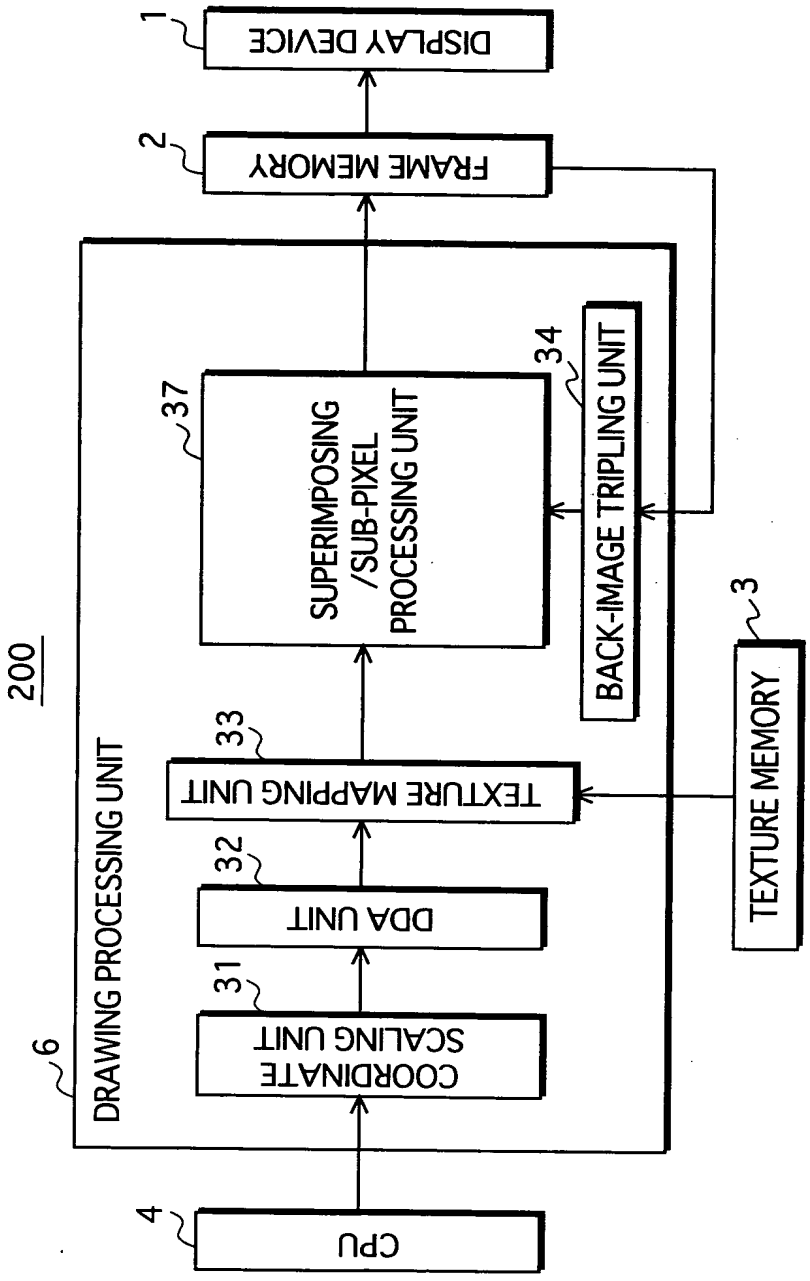

200
1
DISPLAY DEVICE
2
FRAME MEMORY
6
DRAWING PROCESSING UNIT
37
SUPERIMPOSING /SUB-PIXEL PROCESSING UNIT
34
BACK-IMAGE TRIPLING UNIT
3
TEXTURE MEMORY
33
TEXTURE MAPPING UNIT
32
DDA UNIT
31
COORDINATE SCALING UNIT
4
CPU

FIG.14

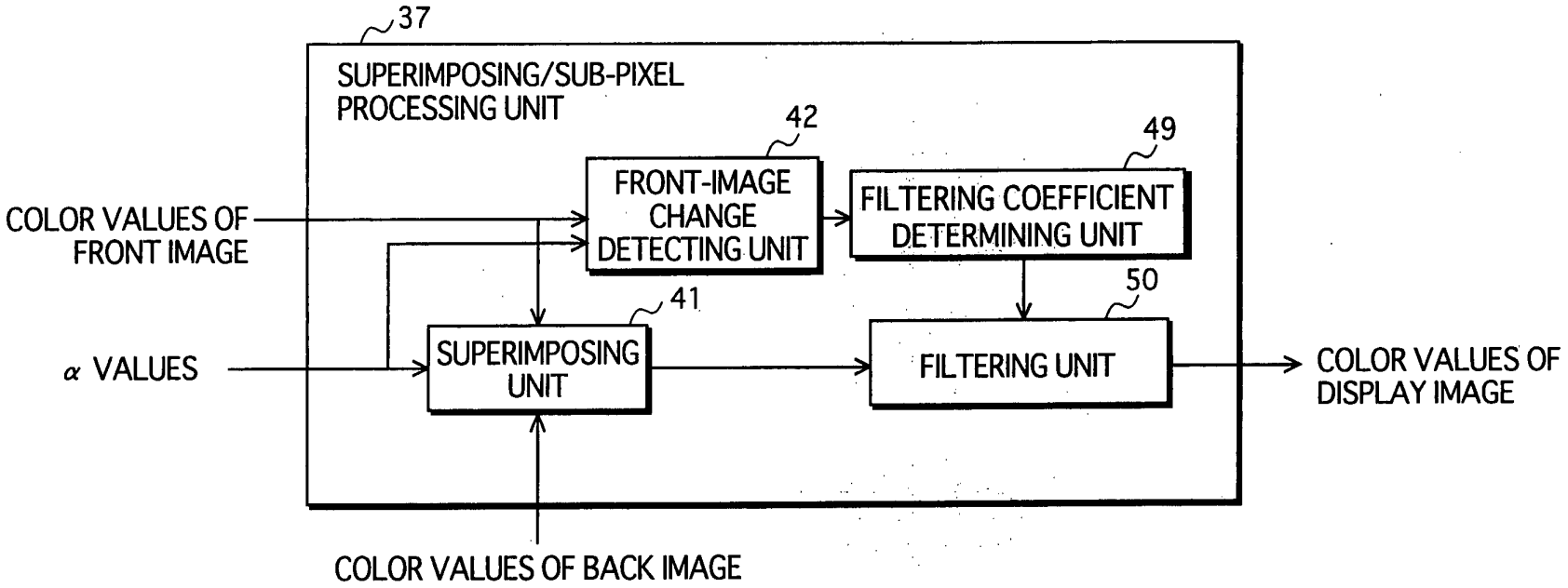

37
SUPERIMPOSING/SUB-PIXEL PROCESSING UNIT
42
FRONT-IMAGE CHANGE DETECTING UNIT
49
FILTERING COEFFICIENT DETERMINING UNIT
COLOR VALUES OF FRONT IMAGE
41
50
α VALUES
SUPERIMPOSING UNIT
FILTERING UNIT
COLOR VALUES OF DISPLAY IMAGE
COLOR VALUES OF BACK IMAGE

FIG.15

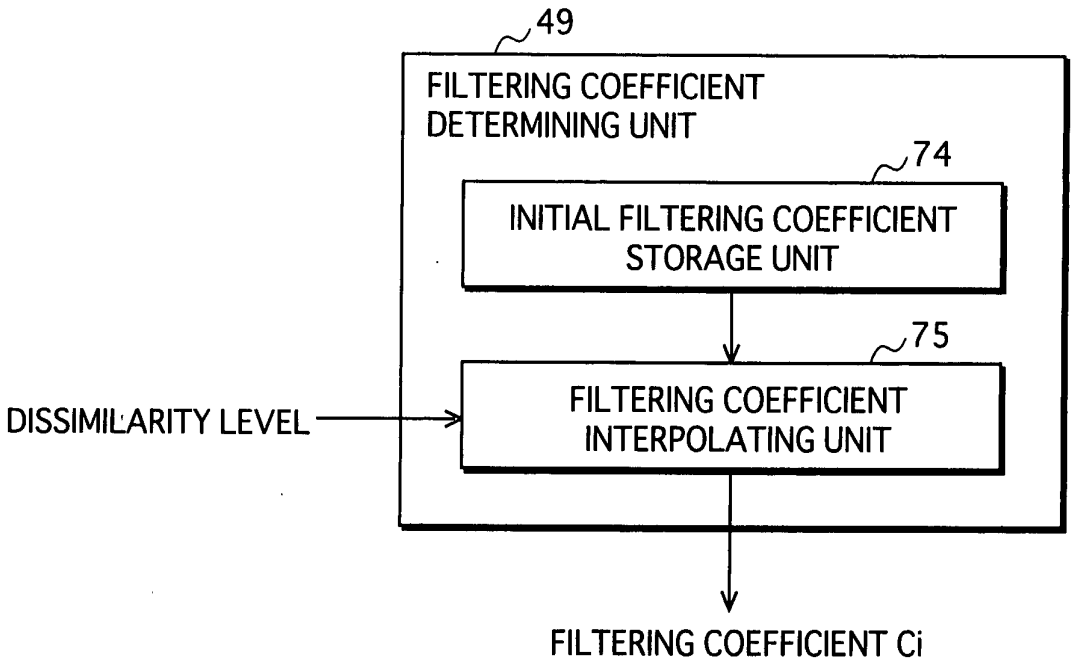

49
FILTERING COEFFICIENT DETERMINING UNIT
74
INITIAL FILTERING COEFFICIENT STORAGE UNIT
75
FILTERING COEFFICIENT INTERPOLATING UNIT
DISSIMILARITY LEVEL
FILTERING COEFFICIENT Ci

FIG.16

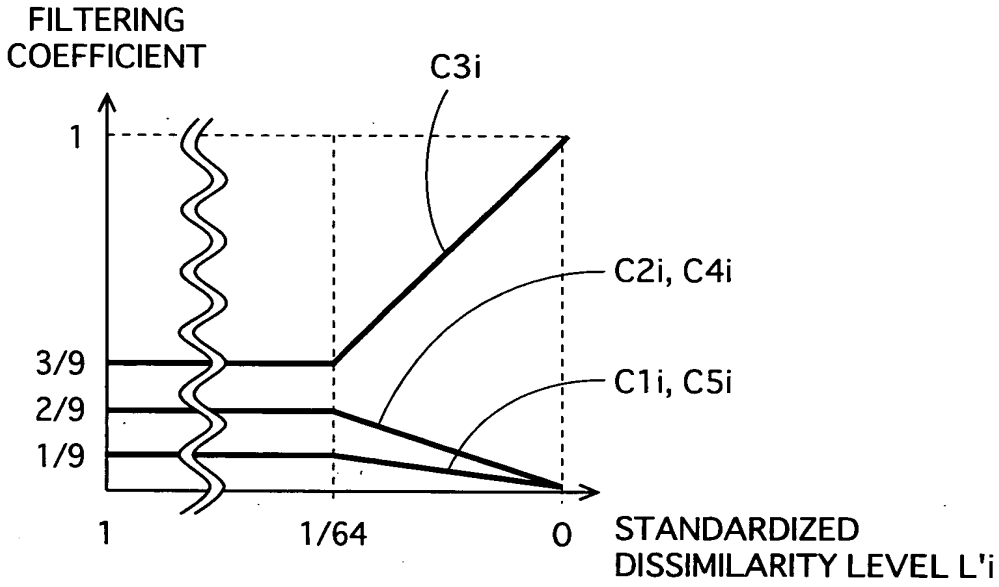

FILTERING
COEFFICIENT
C3i
1
C2i, C4i
3/9
C1i, C5i
2/9
1/9
1
1/64
0
STANDARDIZED
DISSIMILARITY LEVEL L'i

FIG.17

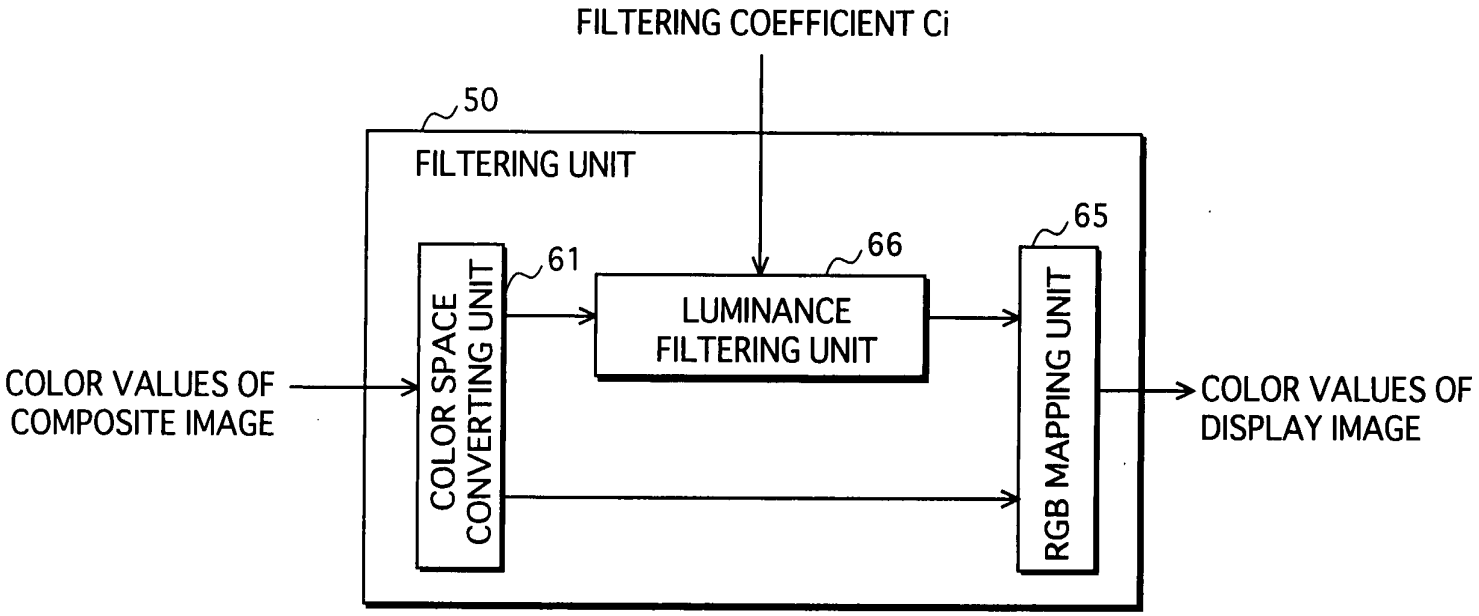
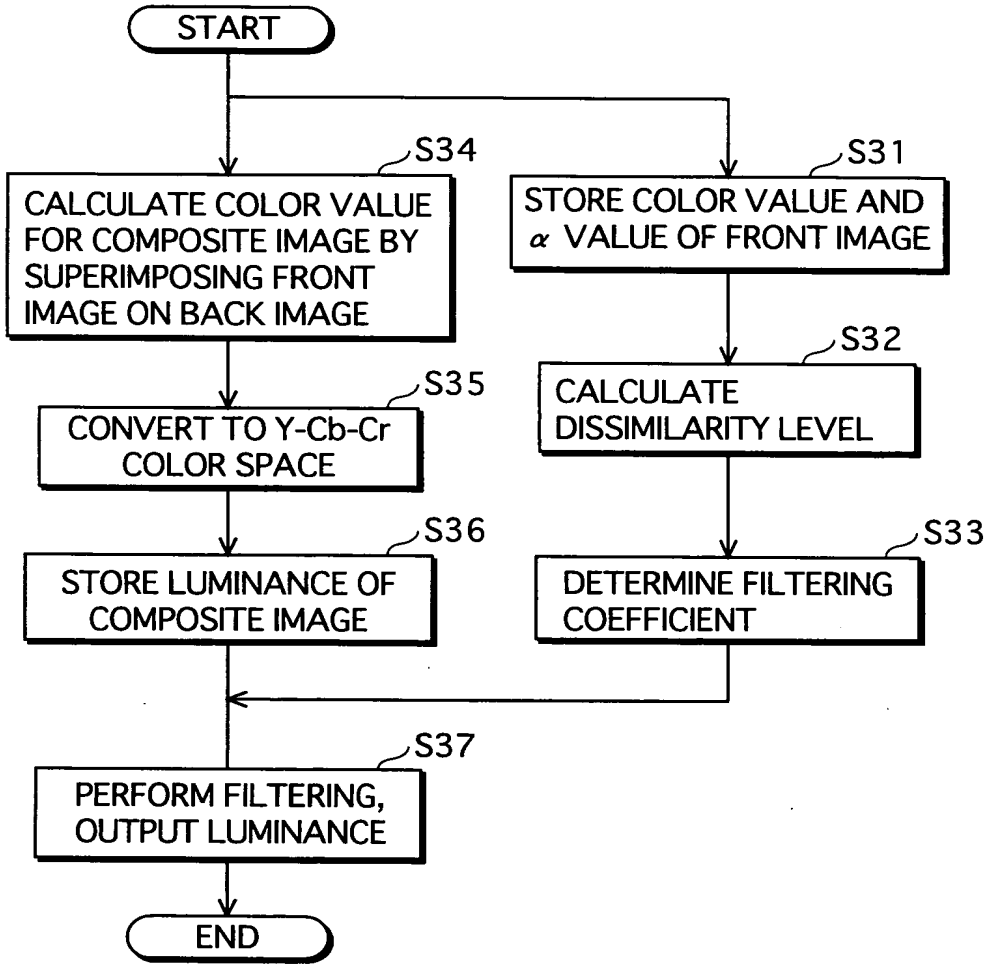

FILTERING COEFFICIENT Ci
50
FILTERING UNIT
61
66
65
COLOR SPACE CONVERTING UNIT
LUMINANCE FILTERING UNIT
RGB MAPPING UNIT
COLOR VALUES OF COMPOSITE IMAGE
COLOR VALUES OF DISPLAY IMAGE

FIG.18


START
S34
CALCULATE COLOR VALUE FOR COMPOSITE IMAGE BY SUPERIMPOSING FRONT IMAGE ON BACK IMAGE
S31
STORE COLOR VALUE AND α VALUE OF FRONT IMAGE
S32
CALCULATE DISSIMILARITY LEVEL
S35
CONVERT TO Y-Cb-Cr COLOR SPACE
S36
STORE LUMINANCE OF COMPOSITE IMAGE
S33
DETERMINE FILTERING COEFFICIENT
S37
PERFORM FILTERING, OUTPUT LUMINANCE
END